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Fighting the Networked Force: Insights from Network Centric Operations Case Studies

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Overview

- **Tenets of Network Centric Operations (NCO)**
  - **Domains of Warfare**
  - **NCO Value Chain**
- **Office of Force Transformation NCO Case Studies**
- **NCO Transformation Process**
  - **Insights and Challenges**

How a Networked Force Operates: Network Centric Operations

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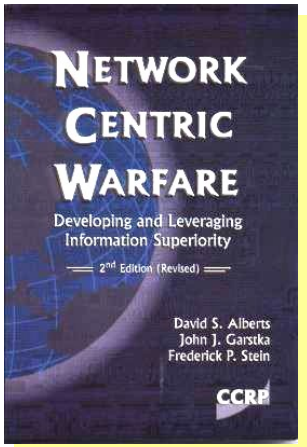
Create Information Advantage – Translates into Warfighting Advantage



Info Advantage - Network Forces (Noun & Verb)

Characterized by:

- Information Sharing
- Shared Situational Awareness
- Knowledge of Commander's Intent

Warfighting Advantage - Exploit Behavioral Change & New Doctrine to Enable:

- Self-synchronization
- Speed of Command

Tenets of Network Centric Operations

...The New Value Chain

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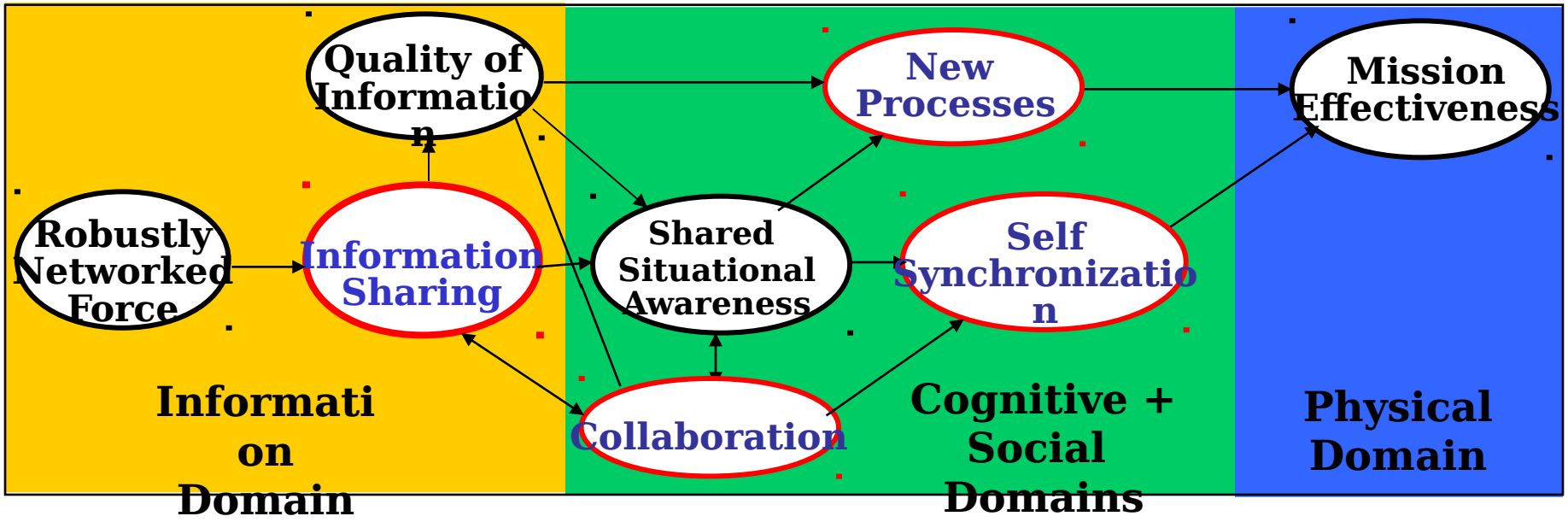
- A Robustly Networked Force Improves Information Sharing
- Information Sharing and Collaboration Enhances the Quality of Information and Shared Situational Awareness
- Shared Situational Awareness Enables Collaboration and Self Synchronization and Enhances Sustainability and Speed of Command
- These in Turn Dramatically Increase Mission Effectiveness



Warfighting Advantage: Evidence for Increased Mission Effectiveness

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- **Maneuver – Networked Ground Forces**
  - **OIF: Networked Coalition Forces Demo Unprecedented Operational Agility / Speed of Maneuver (2003)**
  - **Networked Stryker Brigade Decisively Engages OPFOR at JRTC -- 10 Fold Reduction in Loss / Exchange Ratio from 10/1 to 1/1 (2003-2004)**

- **Offensive / Defensive Counter Air – Networked Air Forces**
  - **Data-Linked USAF F-15Cs Increased Kill Ratio by Over 250%**

    (JTIDS Operational Special Project - Mid 1990's)

- **Fires – Networked Air & Ground Forces**
  - **Networked Air / Ground Force Decisively Defeats NTC OPFOR (USA Division Capstone Exercise - Phase I, Apr 2001)**
  - **Networked Air / Ground Forces Decisively Prosecute Counter TBM (Operation Iraqi Freedom – Western Iraq 2003)**

NCO Case Studies

- **OFT Series of NCO Case Studies**
  - Focus on How Networked Forces Operate *and* Transform to Enable NCO
  - Conducted Across a Range of Mission Areas
  - Examine Exercises, Combat Ops & Peace Keeping Ops
  - Explore How US Forces, US Led Coalition Forces, NATO Forces, & US Allies Operate w/Varying Degrees of Networking Capabilities

- **Findings to Date Clearly Demonstrate…**
  - That Networked Forces Outperform Non-Networked Forces
    - 1.5 X to 10 X Improved Mission Effectiveness
  - Deployment of Less Than Perfect Networks Can Have a Significant Impact on Force Effectiveness by:
    - Significantly Improving Info Sharing
    - Dramatically Enhancing Situational Awareness for Commanders & Their Forces
  - Transformation Processes That Involve *Organizational & Process* Change Are Key to Achieving High Levels of Increased Mission Effectiveness

Breakout of NCO Case Studies

Sea

	Service	Joint/Inter-Agency	Coalition
Land	CTF-50 (OEF) NSWG I (OEF/OIF)		Coalition Maritime Ops (OI
Land	Stryker BCT (JRTC) V Corps/3 ID (OIF) Stryker BCT (SASO)		US/UK Coalition (OIF) NATO ACE Mobile Force Lan NATO Task Force Fox
Air	Air-to-Air (JTIDS)	Air-to-Ground (OEF/OIF)	
Air		Air-to-Ground w/ SOF	
Other		NCO in SASO UK Low Intensity Conflict SARS – Singapore	NATO Response Force Assessment

Completed
Near-Complete
On-Going
Planned

Stryker Brigade Combat Team: Innovation Across all Lines of Development

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1999 2003

Doctrine (Process/Tactics/Techniques/Procedures)

NCO Concepts Build Collaboration Into Battle Rhythm Mission Type Orders Integrated RSTA

Organization

Organic Combined Arms BCT Organic Cav Squadron (RSTA) Organic MI Company & HUMINT Teams

Training

Network-Centric Operations Facility with Battle Command Systems Complex Operating Environment

Material (Technology)

High Density FBCB2 Network ABCS BLOS SATCOM Increased Mobility, Protection, Firepower

Leadership and Education

Agile, Confident, Adaptive Multi-Echelon Collaborative Planning Education

Facilities

Personnel/Culture

Stryker Brigade:

Mission Effectiveness as a Function of Information Position

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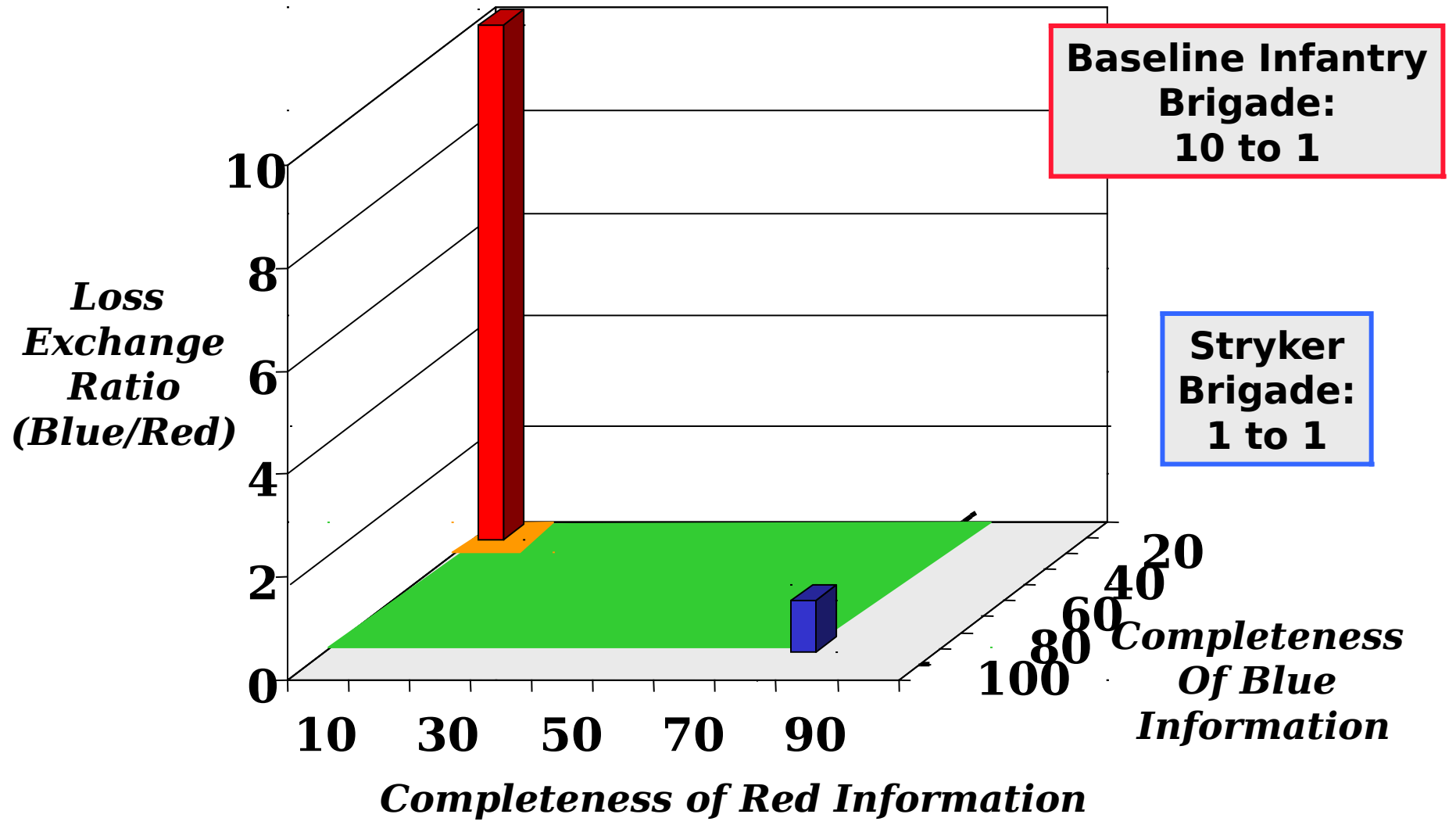

Air to Air Case Study: Voice + Link 16 (JTIDS)

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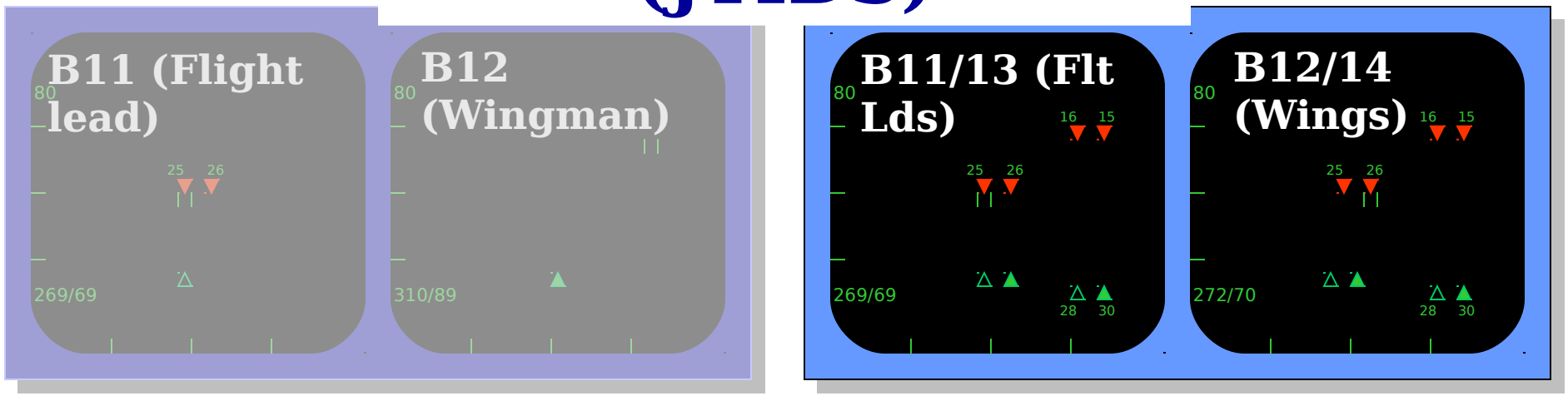

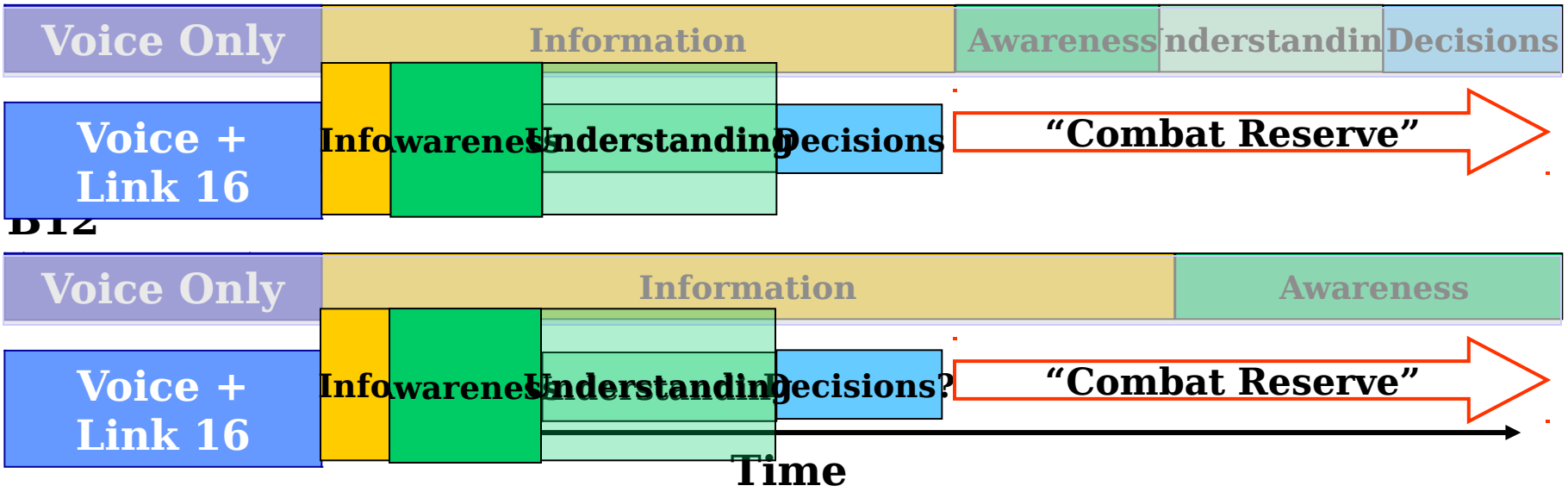

A Common Picture…So What?

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- **Info Completeness: "Ownship" & Other Friendly Aircraft & Formations**
  - **Free Time = Ability to Focus on Fight**
- **Info Superiority: Quick Awareness & Understanding of Enemy Formations**
- **More Decision Time**
  - **More Lethal and/or Survivable Intercept Geometry Decisions**
- **Earlier/Better Targeting**
  - **Improved Shot Lethality**
  - **Higher Number Shots per Time**
- **Battle Manage & Target While Cold (with Same S.A.)**
- **Better Ability to Self-Synchronize ("Swarm")**

Kill Ratio Comparison

	Voice Only	Voice + Link 16
Day	3.10	8.11
Night	3.62	9.40

OIF CAS Example – Voice Only

Scenario: 6 Apr 2003, U.S. Troops Taking Fire from Iraqis on East Side of Bridge

JTAC Callsign: ADVANCE 33

A-10 Callsign: DEMOB 71 & 72

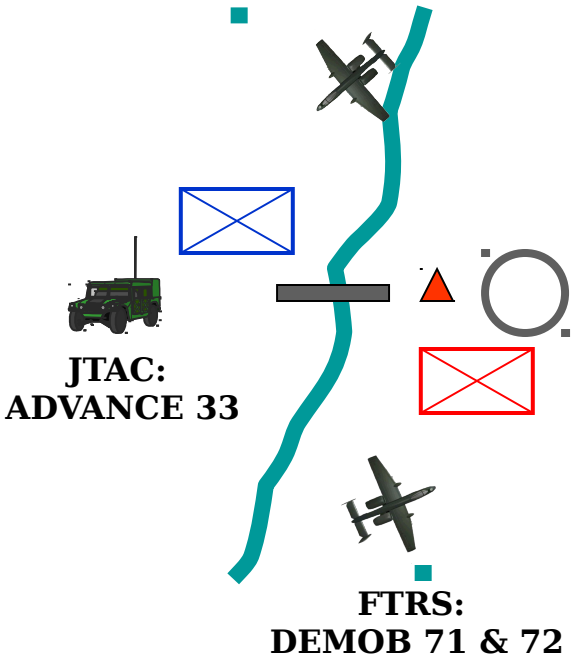
** Watching DEMOB 72 HUD Tape

WX: Poor Visibility & Clouds

Threats: AAA @ Target

Targets: Tanks, Vehicles, Personnel

1. **Target Location & ID:**
2. **Poor Quality of Info**
   Poor Info Share-ability
   Low Shared S.A.
   Blue Air Positional SA:
   Low Shared S.A.
3. **Cognitive Loading:**
   Poor Info Sharing
   Poor Collaboration



DCXI: Nighttime CAS Scenario

(Network Centric Warfare Systems vs. Legacy Systems)

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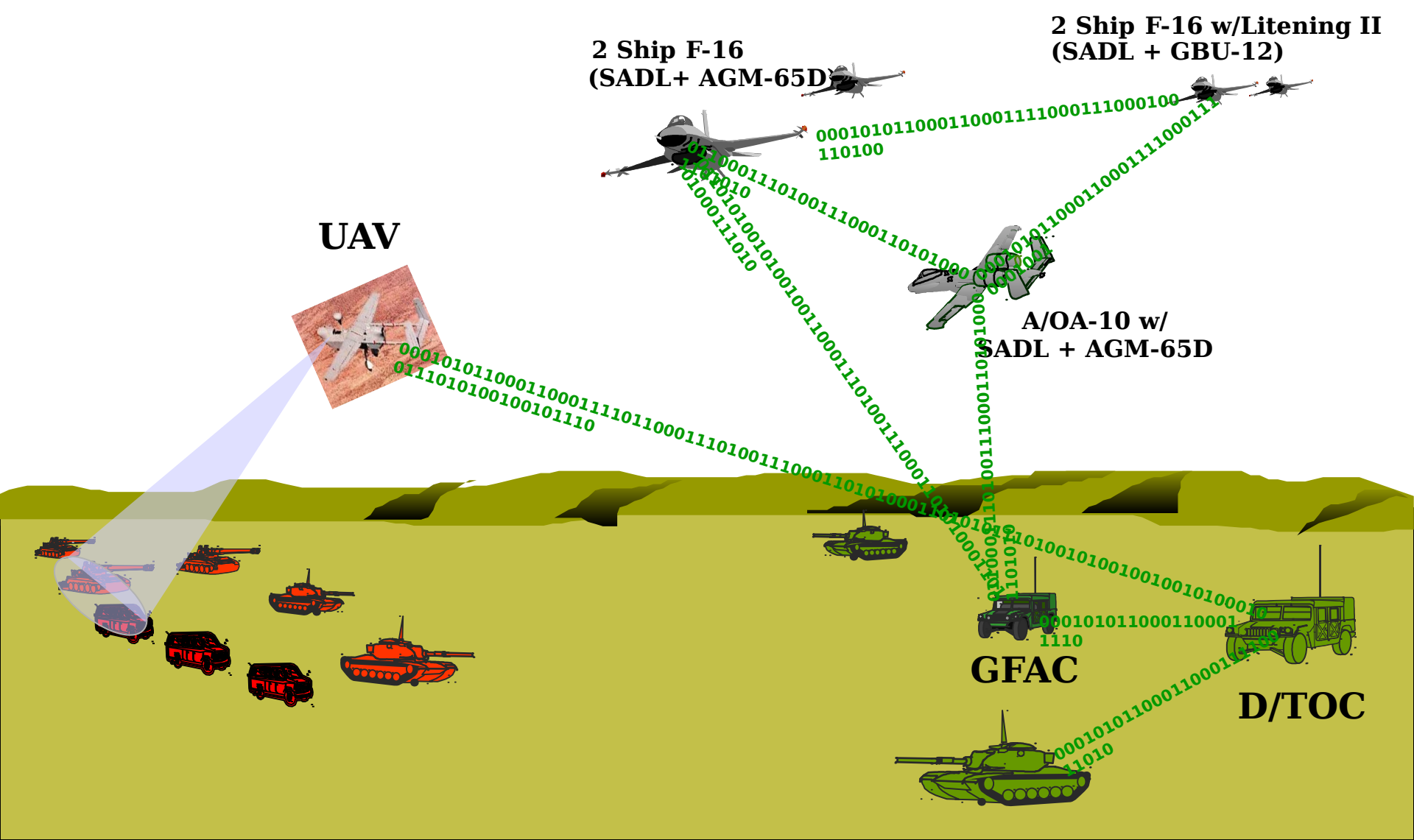

Air-to-Ground: FAC to Fighter Information Sharing

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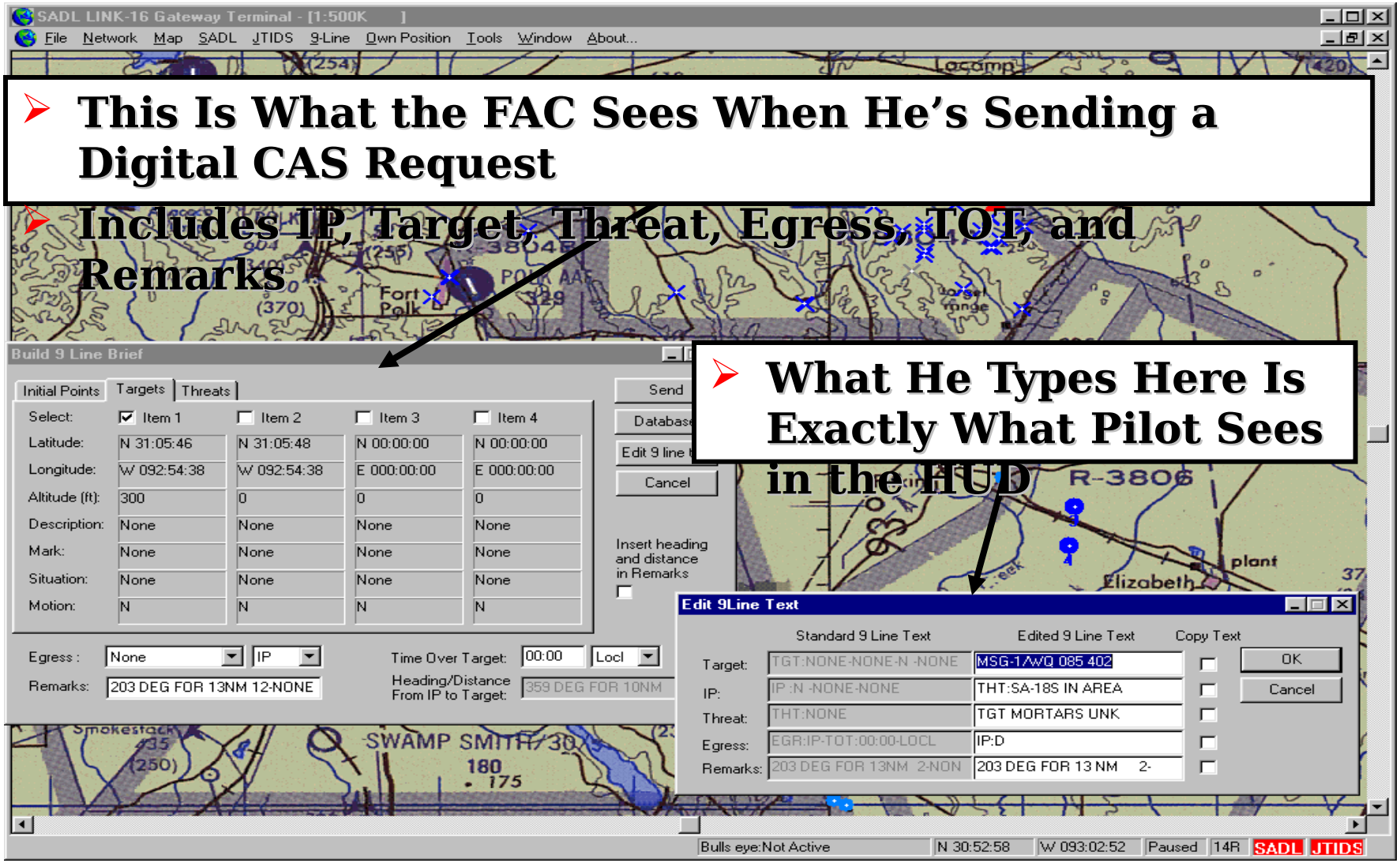

Air-to-Ground:
SADL F-16 Pilot Heads-Up Display

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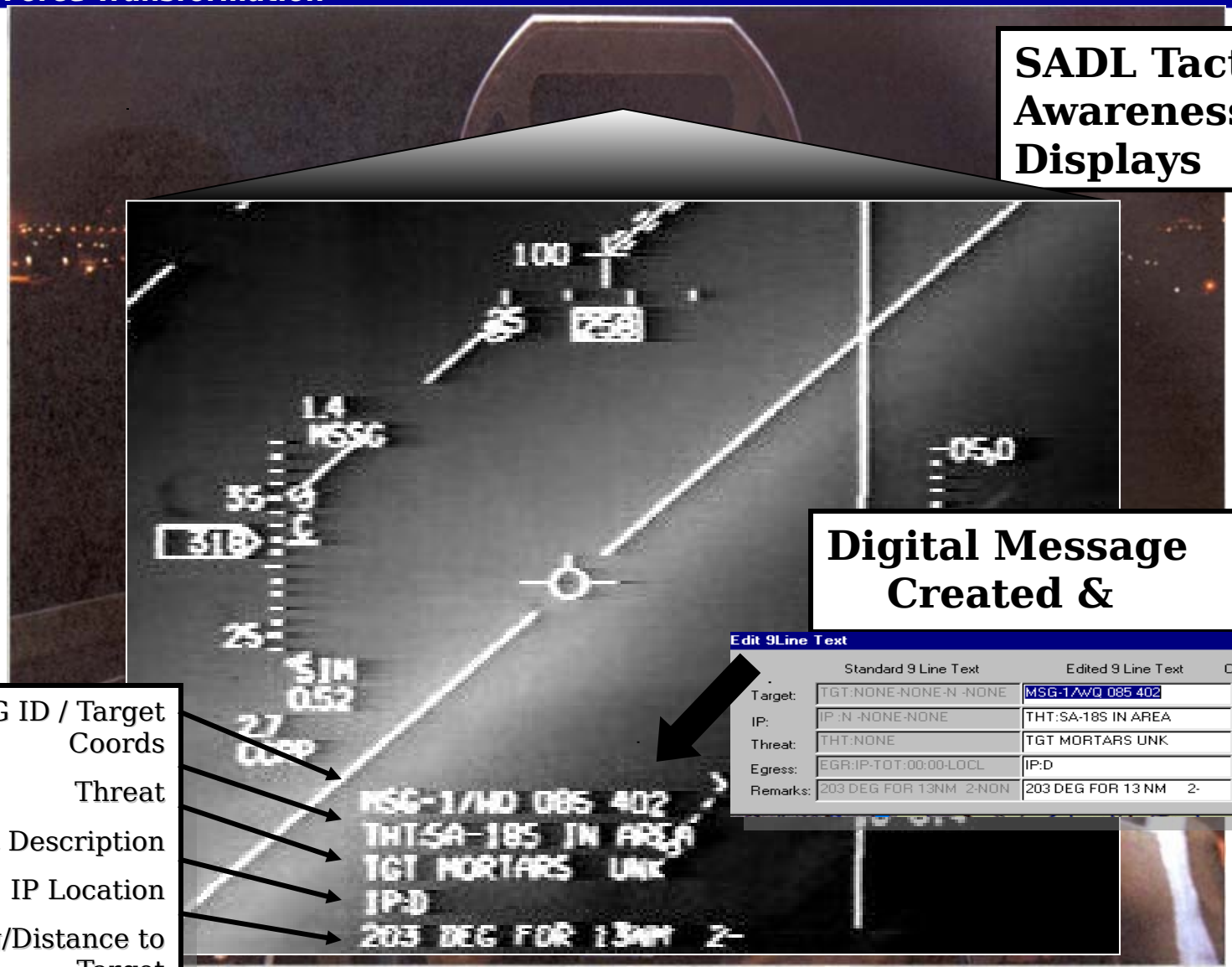
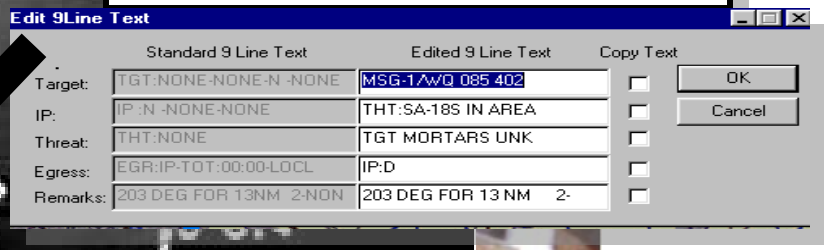


SADL Tactical Awareness Displays

Digital Message Created &



MSG ID / Target Coords

Threat

Target Description

IP Location

Heading/Distance to Target

Air-to-Ground: SADL F-16 Pilot Tactical Picture

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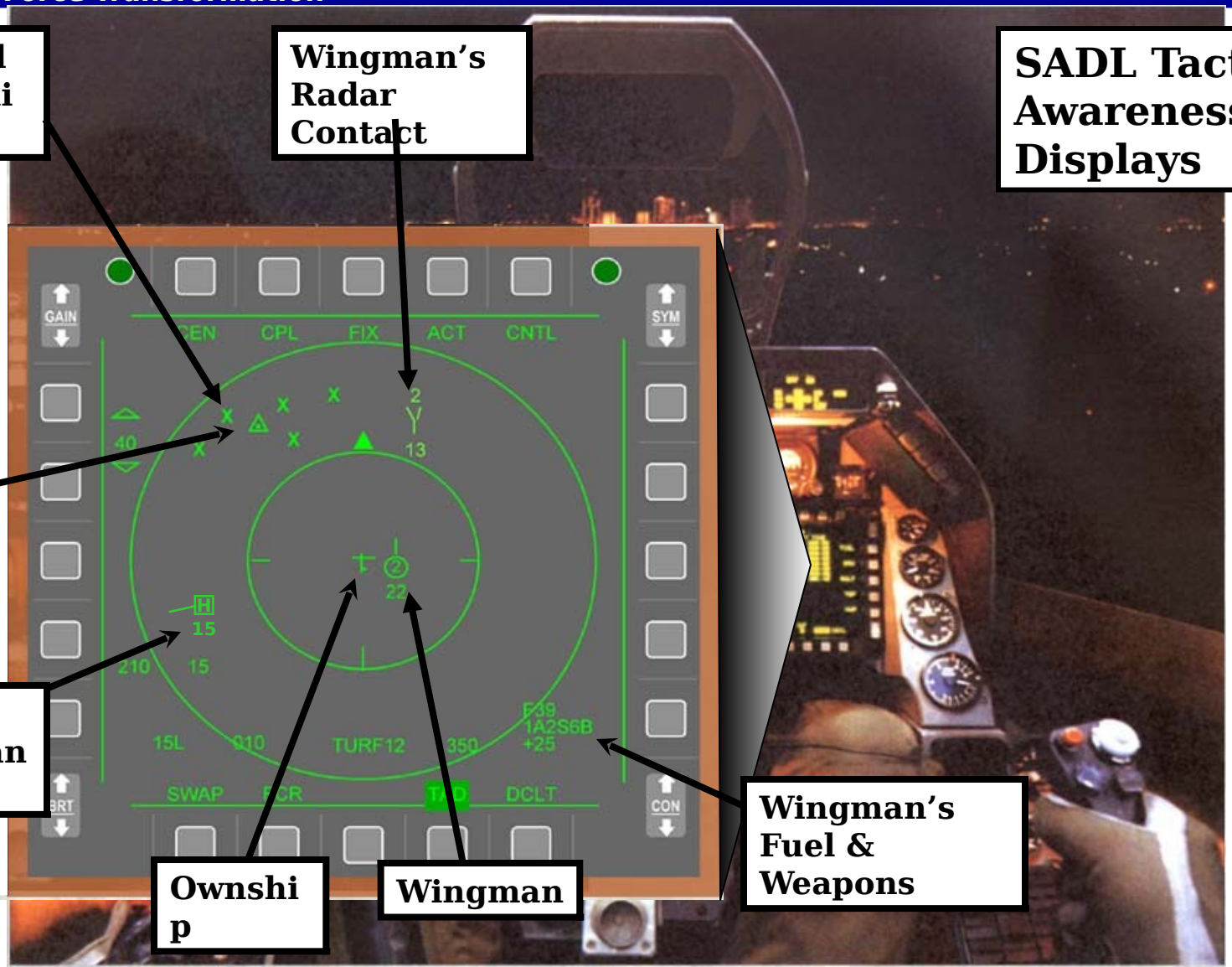

Transformation to Network Centric Operations: Insights and Challenges

- Transformation to NCO Involves ALL "Lines of Development"
  - **Technology**
    - Information Technology (IT) is Critical Enabler
    - Clear Benefit to Focused IT Investments
  - **Doctrinal (Process) and Organization**
    - Changes in These Areas are Key to Achieving Mature Capabilities for NCO
  - **Leadership**
    - Only Leaders Who Understand How Networked Forces Can Operate will Achieve Full Potential of NCO
    - Education & Training Key to Developing This Understanding

- Organizational Learning is Key Element of Implementation Strategy
  - Operational Experience can Accelerate Individual & Organizational Learning
  - NCO Short Course is an Experiment in Organizational Learning

Implementing Network Enabled Capabilities: Innovation Across all Lines of Development

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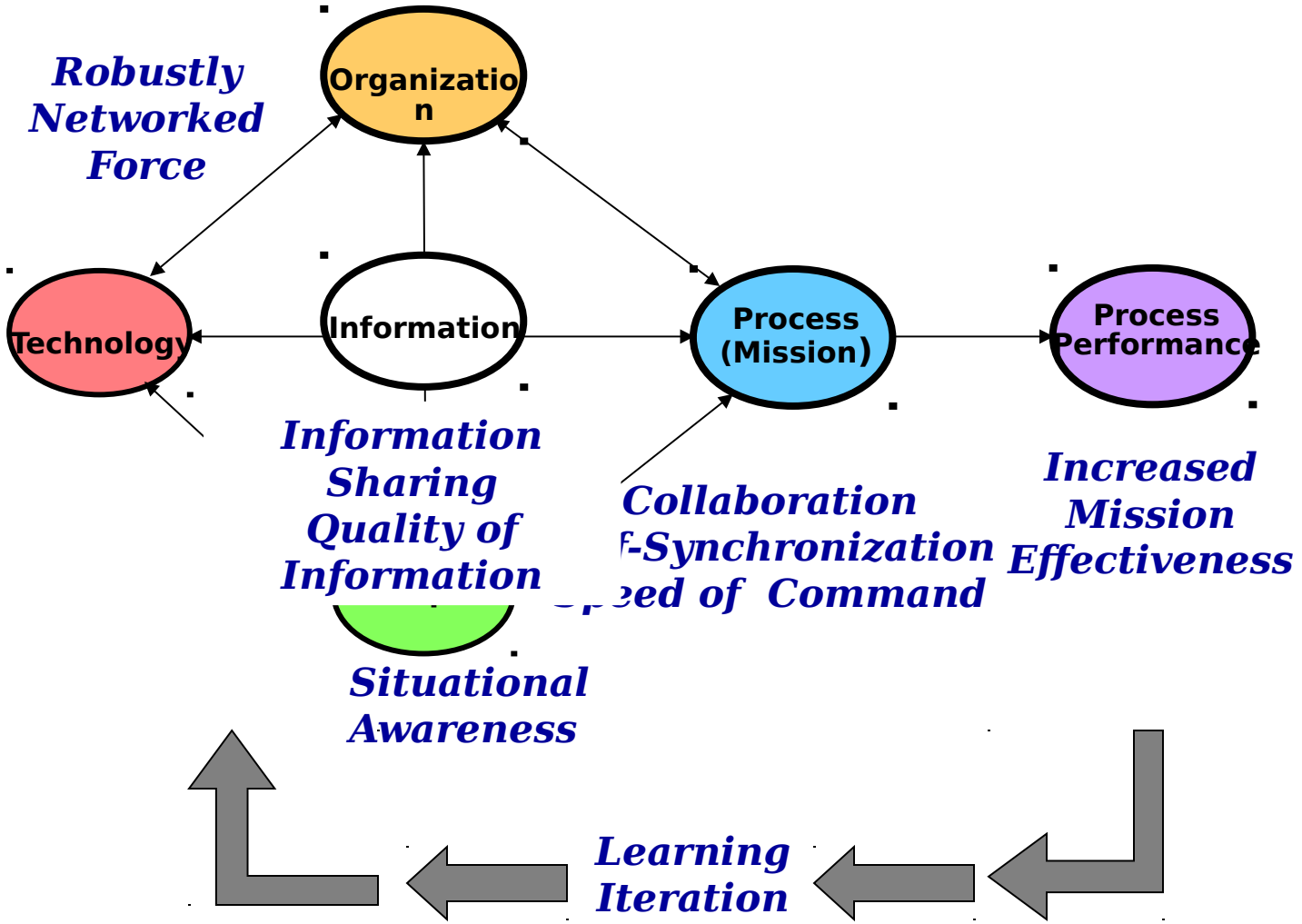

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